

Soil Fertility Status May Be Reaching Critical Yield-Limiting Levels

Study shows impact of fertilization practices, validates importance of soil testing as starting point for 2010 fertility planning

In many areas of the Corn Belt, nutrient budgets have become very negative due to changes in the way growers have fertilized their crops in recent years. That's according to a new study recently completed by the International Plant Nutrition Institute (IPNI). The study details the nutrient balance of phosphorus (P) and potassium (K) added through commercial fertilizer and manure in 2007 and removed in harvested grain for the average of 2006-2008 on a county-by-county basis.

"Potassium and phosphorus application took big hits last year, and that means there are some very negative nutrient budgets . . . quantity applied minus quantity removed by crops . . . for key crop areas," says Paul Fixen, senior vice president for Americas Group and director of research at IPNI. "Prior to the 2009 season, much of the Corn Belt was running a P deficit with crop removal in Iowa exceeding use by 20 to 30 percent and in Illinois by 50 to 60 percent. Realize these were the budgets prior to the recent reduction in use."

The IPNI is a not-for-profit, science-based organization with a focus on agronomic education and research support. The IPNI database compares average soil nutrient application levels (from both commercial fertilizer and manure) to crop removal levels based on crop yield for N, P and K. In many areas nutrient removals exceed application levels. A summary of the study is available at www.infoag.org/presentation.php?id=21 and the full report should be available at www.ipni.net later this fall. The Mosaic Company is creating area-specific maps of the information.

2009 fertilizer cut backs further deplete soil nutrients

Traditionally, when fertilizer was an inexpensive input, growers fertilized at or above recommended rates, building the nutrient profile of their soils. In recent years, fluctuating crop prices and high fertilizer prices, coupled with weather that prevented application, resulted in growers cutting back on their fertilizer rates.

With excellent yields the past three to five years, plus lower application rates in 2009, soil nutrient levels may actually be lower than past trends and the IPNI information show.

“Even though crop yields have increased significantly in recent years, many growers have not increased their fertilizer rates. With the higher yields, crops are pulling nutrients from the soil's nutrient bank and mining the soils,” explains Dan Froehlich, director of agronomy for The Mosaic Company.

“In 2009 some growers applied nearly 50 percent less potassium and cut phosphorus by 20 to 30 percent. The report shows many areas were at or below the critical level for these key nutrients even before the fertilizer cut backs of 2009,” Froehlich continues.

Maintaining fertility levels is critical for maintaining yields. For example, a field testing 10 ppm for P that does not receive phosphorus fertilizer would be expected to produce corn yields 20 percent lower than a field with soil P levels at the critical 20 ppm level.

“To maintain crop yields and farm profitability, progressive growers and retailers will definitely want to soil test immediately after harvest to get a true picture of the soil nutrient levels within each field,” he adds.

Now is a good time for growers to talk with their retailer to get on the schedule for post-harvest soil testing. A soil test is an important investment in the production decision process because it allows comparison of the soil nutrients available to what the crop needs to reach the desired yield goal and yield potential. And it's important to use this information to properly balance all needed nutrients, not just for applying nitrogen.

“Growers often attempt to rely on nitrogen only. They forget potassium interacts with essential plant food nutrients and ‘regulates’ many essential plant processes,” says Froehlich. “Without K, plants can't optimize uptake of available N. So, the money growers spend on N may be wasted.”

For example, research at Ohio State demonstrated that corn yields were reduced by 44 bushels/acre when high levels of N were used on fields with inadequate K levels. At \$3.25 corn, the foregone bushels would cost the grower \$143 per acre.

Likewise, adequate P is necessary for higher yields and improved grain quality because P also improves the plants' ability to use all available nutrients. Without adding P fertilizers to balance nutrition, plant uptake of N is reduced. Again, nitrate levels in the soil increase, and some of the grower's investment in N is lost.

"We encourage growers to visit with their local fertilizer retailer soon to get a handle on the nutrient balance situation in their area and to begin planning for the nutrient needs of the 2010 crop," Froehlich concludes. "With a clear picture of the situation on their own farm, they can develop a fertility plan for 2010 that will meet the crop nutrient needs and optimize their production and profitability."

For more information about proper crop nutrition, soil testing and the importance of balanced soil fertility, visit www.Back-to-Basics.net.

About The Mosaic Company

The Mosaic Company is one of the world's leading producers and marketers of concentrated phosphate and potash crop nutrients. Mosaic is a single source provider of phosphates and potash fertilizers and feed ingredients for the global agriculture industry. More information on the company is available at www.mosaicco.com.

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